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Notice of and reason for the Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list *Amytornis modestus inexpectatus* (Matthews, 1912), Thick-billed Grasswren, as an EXTINCT SPECIES in Part 1 of Schedule 3 of the Act and, as a consequence, to omit reference to *Amytornis modestus inexpectatus* as an Critically Endangered species in Part 4 of Schedule 1 of the Act. Listing of Species Presumed Extinct is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Amytornis modestus inexpectatus is eligible to be listed as an Extinct species.

The NSW Threatened Species Scientific Committee has found that:

1. *Amytornis modestus inexpectatus* (Matthews, 1912) (Thick-billed Grasswren) (Maluridae), is currently listed as a Critically Endangered species in the Act.

2. *Amytornis modestus* (North, 1902) (Thick-billed Grasswren) is one of 11 presently recognised species within the purely continental Australian genus *Amytornis* (Black 2016). Until recently the species *A. textilis* was recognised across Australia, however since 2010 the eastern and western populations have been placed in *A. m. modestus* (Thick-billed Grasswren) and *Amytornis textilis* (Western Grasswren), respectively (Christidis *et al.* 2010). A recent taxonomic assessment identified seven subspecies of *A. modestus* (Black 2011, 2016; Austin *et al.* 2013): five subspecies are extant - *A. m. cowarie* (South Australia [SA]), *A. m. curnamona* (SA); *A. m. indulkanna* (SA, Northern Territory [NT]); *A. m. obscurior* (NSW, far south Queensland [Qld]); and *A. m. raglessi* (SA). The remaining two subspecies are *A. m. inexpectatus* (formerly from NSW) and *A. m. modestus* (formerly from NT) are considered to be extinct (Garnett *et al.* 2011; Black 2016).

3. *Amytornis modestus inexpectatus* was described from NSW but the locality of the type material and its collector were not identified in the original publication (Black *in litt.* Dec 2018). Circumstantial evidence suggests that the type material was one of Bennett's collections from the "Mossgiel District" (perhaps in the vicinity of Willandra Creek), although Matthews (1912) thought that the type specimens might have been from the Namoi River, Gould's collection locality, some 400 km to the northeast (A. Black *in litt.* Dec 2018). Recent reviews (*e.g.* Black *et al.* 2014; Black 2016) have accepted that the Namoi/Liverpool Plains and Mossgiel/Willandra populations are of the same subspecies, as implied by Mathews, although this has never been fully tested.

4. *Amytornis modestus* (Thick-billed Grasswren) is characterised by cryptic plumage patterns with body colouration generally mid to pale brown above, paler below, with a moderately streaked appearance above, moderately to barely streaked below; tail varying from moderately long to short, slightly longer or of the same length in males; and, a deep bill (Black 2011). *Amytornis m. inexpectatus* has the longest tail in the species, a relatively slender bill and appears darker and more heavily streaked than most other subspecies (Black 2016).

5. Available records of *Amytornis modestus inexpectatus* are restricted to NSW and it is unclear if this species was endemic to NSW. *Amytornis* subspecies typically have narrow distributions (Christidis *et al.* 2010). This subspecies had formerly occurred in central and western NSW, from the lower reaches of the Namoi River, southwest to Mossgiel, however the most recent record is from 1886 (Garnett *et al.* 2011). It is likely that *A. m. inexpectatus* was first collected by Charles Coxen, perhaps on the Liverpool Plains, and shortly thereafter found by Gould to be abundant on the lower Namoi (Black *in litt.* 13 Dec 2018). Thomas Mitchell sent a specimen from an unknown locality to the British Museum in 1847 and another specimen was reported from "the northern districts" in 1855 (Black *in litt.* 13 Dec 2018). Samuel White might have taken other specimens in 1868, also from an unknown locality (Black *in litt.* 13 Dec 2018). In the late 1880s it was observed and collected in the "Mossgiel District" by K H Bennett (McAllan 1987; Black and Gower 2017) but there have been no subsequent reports from either area since (Black *in litt.* 13 Dec 2018).

6. Grasswrens are very specific in their habitat requirements and Thick-billed Grasswrens are almost entirely restricted to low chenopod low shrublands, generally in depressions and drainage lines on stony plains (Black 2016). Habitats occupied by the long-extinct populations of *Amytornis m. inexpectatus* have not been confidently determined but were probably chenopod or Nitrebush *Nitraria billardierei* shrublands or low shrublands (Black 2016). The density and structure of low vegetation has been demonstrated to be an important factor in predicting the presence of other subspecies of *A. modestus* (Black *et al.* 2011). Grazing by cattle and elevated densities of macropods, widespread within the former range of this subspecies, simplifies vegetation structure (Keith 2004) and grazed areas have fewer arthropods (a food source) (Louter 2016). It is not clear what level of grazing is deleterious for this subspecies (Cooper *et al.* 2016). Nest predation and brood parasitism appear to be low for other subspecies, with rodents and snakes the most likely nest predators (Louter 2016).

7. The cause of extinction of *Amytornis modestus inexpectatus* has been attributed to destruction of habitat by livestock, feral herbivores, drought and wildfire (Schodde 1982; McAllan 1987; Garnett *et al.* 2011). Soon after 1886 the 'federation drought' commenced, and this followed a decade of exceptionally high stocking rates in the region (McAllan 1987; Garnett *et al.* 2011). This led to reduced vegetation cover and damage to soils. Rabbits likely arrived on the Hay Plains around 1886, further increasing grazing pressure (Cooper *et al.* 2016). In this period introduced predators, including foxes (which likely arrived just after the federation drought) and cats are likely to have had a negative impact (Reid and Fleming 1992; Catling and Coman 2008; Denny 2008). Chenopod shrublands (and other suitable habitats) have also been substantially modified by exotic and native herbivores, which have been present at unusually high densities due to the installation of artificial watering points (James *et al.* 1999; Keith 2004). James *et al.* (1999, citing Curry and Hacker 1999; Reid and Fleming 1992; Smith and Smith 1994; Smith *et al.* 1994) include the Thick-billed Grasswren in the list of taxa negatively impacted by the provision of artificial watering points. The Thick-billed Grasswren is a poor flyer with limited dispersal capability and is highly susceptible to population fragmentation (Garnett & Crowley 2000; Higgins *et al.* 2001).

8. *Amytornis modestus inexpectatus* is considered to be extinct (Garnett *et al.* 2011; Black *et al.* 2011; CTSSC 2014; Black *et al.* 2013; Austin *et al.* 2013; Black *et al.* 2014; Black 2016; Slender *et al.* 2017; D Watson *in litt.* 7 Dec 2018; A Black *in litt.* 13 Dec 2018; del Hoyo *et al.* 2019). There have been no records over a long (>130 years) period of time, despite adequate targeted survey within suitable habitat (Cooper *et al.* 2016; A Black *in litt.* 13 Dec 2018). There has also been a substantial loss of habitat and a long history of other negative impacts across regions

of known records. Grasswrens are cryptic (Cooper *et al.* 2016). For example, *A. m. obscurior* remained undetected for over 70 years before it was rediscovered (Parker *et al.* 2010). Similarly, the Eyrean Grasswren *A. goyderi* was first recorded in NSW in 2016 on the edge of its distribution, despite being first discovered in 1874 from South Australia (McAllan *et al.* 2017). Despite the difficulty in detecting *A. m. inexpectatus*, the long period of time without records (despite active surveys) combined with a reduction in habitat quality and extent and severity of historic threats is sufficient evidence to list this subspecies as extinct.

9. *Amytornis modestus inexpectatus* (Matthews, 1912) Thick-billed Grasswren is eligible to be listed as an Extinct Species. In the opinion of the NSW Threatened Species Scientific Committee, there is no reasonable doubt that the last member of the taxon in Australia has died, it is not known to occur in captivity or as a naturalised population well outside its past range, and it has not been recorded in its known or expected habitat in Australia, despite targeted surveys, over a time frame appropriate to its life cycle and form.

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NSW Threatened Species Scientific Committee

Supporting document:

Hope B, Kerle A (2019) Conservation Assessment of Thick billed Grasswren *Amytornis modestus inexpectatus* (Matthews, 1912). (NSW Threatened Species Scientific Committee: Hurstville, NSW)

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